

**Organic Farming for Sustainable Agricultural Development**

- The agriculture sector is the backbone of Indian economy. Based on Usual Principal Status Approach, **46.1 percent of the persons** were estimated to be **employed under agriculture** in India during 2015-16.
- The health of the individual is at greater risk than ever before because of the chemicals that we ingest into our bodies through the inorganic food we eat.
- Therefore, organic agriculture provides high nutrient foods to human beings and animals for their well-being.

**Status of Organic Agriculture:**

- The **global ranking of India** in organic agriculture stood at **eighth position** with **1.78 million hectares** of area under it in 2017.
- The **share of organic agricultural land** of India was **2.55 percent** in the total world of organic agriculture.
- India has the **highest number of organic producers** in the world accounting to 30.58 percent.
- Its total production was 16,75,560.70 metric tonnes in the year 2017-18.
- In 2016, **Sikkim became the first organic state of India.**
- India's per capita consumption of organic food was 0.2 Euros as against the world's per capita consumption (12.2 Euros).
- In India, among all the states Madhya Pradesh has effectively implemented organic practices and schemes.
- Therefore, **Madhya Pradesh has the highest area and production** within the country since the last decade.

**The concept of Organic Farming:**

- The system of organic farming is based on an intimate understanding of nature's laws and rules.
- Organic agriculture is a production system that **sustains the health of soils, ecosystems, and people**. It **relies on ecological processes, biodiversity and cycles adapted to local conditions**, rather than the use of inputs with adverse effects.

**Principles of Organic Agriculture:**

- The principles of organic farming were formulated and developed in September 2005 by IFAOM. These are:
  - **The Principle of Health:** sustain and enhance the health of soil, water, air, environment, animal, human and plant as one and indivisible.
  - **The Principle of Ecology:** based on living ecological systems and cycles.
  - **The Principle of Fairness:** build on relationships that ensure fairness with regard to the common environment and life opportunities.
  - **The Principle of Care:** should be managed in a precautionary and responsible manner to protect the health and well-being of current and future generations and the overall environment.

**Characteristics of Organic Farming:**

- Protecting the **long term fertility of soils** by maintaining organic matter levels, encouraging soil biological activity, and careful mechanical intervention.

- Providing **crop nutrients indirectly** using relatively insoluble nutrient sources, which are made *available to the plant by the action of soil micro-organisms*.
- **Self-sufficient in Nitrogen** through the use of legumes and biological nitrogen fixation.
- **Weed, disease and pest control** by relying primarily on crop rotations natural predators, and limited (preferably minimal) thermal, biological and chemical intervention.
- The **extensive management of livestock**, paying full regard to their evolutionary adaptations.
- Careful attention to the impact of the farming system on the wider environment.

**Benefits:**

- **Improving Soil Fertility**
- **Improving water Quality:** Organic can optimize soil nutrient release and plant nutrient uptake, and subsequently, water infiltration, and nutrient retention also reduce the risk of groundwater pollution.
- **Energy and Climate Change:** Organic farms often decrease the greenhouse gas emissions associated with both infield and embedded emission components. Many of the practices associated with certified organic production, such as diverse crop rotations, use of cover crops, and application of compost manures enhance the accumulation of carbon in soil.
- **Protection of Biodiversity**

**Components of Organic Farming for Sustainable Agriculture Development:**

1. **Crop Rotation:** It is a systematic arrangement for the growing of various crops in a more or less regular sequence on the same land covering a period of two years and more.
2. **Crop Residue:** About fifty percent of the crop residues are utilized as animal feed, the rest could be very well utilized for recycling of nutrients.
3. **Manure:** The organic manure is derived from biological sources like the plant, animal and human residues.
4. **Waste:**
  - **Industrial Waste:** Among the industrial by-products, spent wash from distillery, molasses and press mud from industry have good manure, value.
  - **Municipal and Sewage Waste:** Sewage sludge, particularly from industrialized cities, is contaminated with heavy metals and these pose hazards to plants, animals and human beings.
5. **Biofertilizers:** Biofertilizers is *microorganism's culture capable of fixing atmospheric nitrogen* when suitable crops are inoculated with them. The main inputs are microorganisms, which are capable of mobilizing nutritive elements from non-usable form through a biological process.
6. **Bio-Pesticide:** Bio-pesticides are natural plant products that belong to the secondary metabolites, which include thousands of alkanoids, terpenoids, phenolics, and minor of alkaloids, terpenoids, phenolics, and minor secondary chemicals. Their biological activity against insects, nematodes, fungi and other organisms is well documented.
7. **Vermicompost:** Vermicompost has a component in biological farming, which is found to be effective in enhancing soil fertility and producing large numbers of agricultural crops. The average nutrient content of vermicompost is much higher than that of FYM.

**Key Indicators of Organic Farming: World**

- **Australia is leading** an expansion of organic farming area accounting 35.65 million hectares (51.07 percent) in the world.

**Conclusion:**

- A strong national organic policy is the need of the hour to address the important current issues and obstacles and for promoting the current culture in the country.
- Considering the current organic status of India, It has a wide scope for increasing organic practices for the achievement of sustainable development of agriculture.

**Natural Resources Management and Bio-Diversity Conservation**

- Organic farming is based on the **principle of circular causation** with emphasis on the use of organic supplements for enhancing soil quality, minimizing food associated health risks and establishing a closed nutrient cycle to ensure the sustainability of agro-ecosystems.
- Organic farming although yields a bit lesser (10-15%) than the conventional farming, the lower yields are compensated by lower input costs and relatively higher profit margins.

**Opportunities in Organic farming:**

- A. Conservation perspectives:** Organic farming practices are ecologically sustainable in terms of (1) soil fertility stability, (2) increased diversity of microbes, plants and animals, (3) increased carbon sequestration and (4) reduced energy dependence.
- B. Economic sustainability:** The conventional mode of agriculture, which works on the principle of diminishing return, may cause long-term economic risks influencing the overall balance of trade compared to its sustainable counterpart. In a sustainability perspective of organic farming, the following issues need concern:
  - 1. Export orientation:** Policies considering local demands/markets are needed for a rational balance of trade.
  - 2. Market risk:**
  - 3. Employment:** The organic farming system, being labor-intensive can help overcome rural employment.
  - 4. Cost-benefit analysis:** Organic farming can reduce pesticide use by 50% to 65% without compromising crop yields and quality together with 50% less expenditure on the fertilizer and energy use.

**Constraints in Organic Farming:****A. Environmental constrains**

- 1. Water quality:** Wastewater irrigation has become a very common practice in many countries including India. Irrigation of crops with wastewater may cause heavy metal accumulation and degrade soil quality. For the success of organic farming, efforts should be made to ensure the availability of contamination-free fresh waters.
- 2. Atmospheric deposition:** High atmospheric deposition and accumulation of heavy metals in crops and vegetables have also been reported in India. The atmospheric deposition of heavy metals may constrain compromising organic farming with respect to its ability to stabilize soil fertility and provide toxin-free produce.

**B. Resources need**

- With the advent of technology, the livestock population in our country has declined sharply.

- A large part of the rural population in our country is poor and depends on animal manure for domestic fuel. This further constrains the availability of animal manure for agricultural use.
- To remove this 'competitive' constraint, useful options and appropriate farm-scale management strategies are required.
- Lack of sufficient stock of vermicompost and biofertilizers in the local market further constrain the organic producers.
- Further, constraints associated with the availability of appropriate amount of biopesticides may also lead organic producers in India to risk.
- Additionally, most of the crop residues in our country are removed from the fields for the purpose of fodder and fuel. This has led the use of mulch farming technique towards failure.

### **C. Certification**

- Problems associated with certification, for instance, a **time lag of three-years** (conversion stage), often constrain small landholders from adopting organic farming. The certification is essential to authenticate organic produce and to validate the price margin in the market.
- **Lack of knowledge and access to certification discourage** the small farm holders in India. To overcome these issues, training and institutional demonstration with fiscal incentives is being provided to encourage small farm holders.

### **D. Social acceptance**

- The majority of small farm holders depend on government incentives and are striving for a profit margin in the indigenous market. Therefore, small farm holders in our country are apprehensive towards adopting organic farming.
- **Major issues that need to be resolved** to encourage acceptance in small farm holdings include access to certification, lack of local market, cost-benefit anomalies, lack of appropriate knowledge to RMPs and non-availability of organic supplements.

### **Conclusion:**

- With a large geographical area and diversity of eco-region, our country has a considerable potential to capitalize on organic farming.
- Therefore, an integrated effort is needed by the government and non-government organizations to remove constraints encouraging small farm holders to adopt organic farming as a solution to meet food demand while conserving the soil, water, energy and biological resources.

## **Status, Potential and New Technologies in Organic Farming**

### **Deteriorating Situation in Conventional Agriculture:**

- Usage of chemical fertilizers in incremental does over the years led to the deterioration of soil character, made the plants fertilizer sensitive and disturbed the pest-predator relationships, which automatically generated the necessity for application of pesticides.
- To further add to the dilemma, crop productivity has been going downhill from the fertilizers following the '**Law of Diminishing Return**'.

### **Why Organic Farming?**

- It is believed that organic farming can solve many of these problems as this system is believed to maintain soil productivity and effectively control pest by enhancing natural processes and cycles in harmony with environment.
- Organic farming is defined as a production system which **largely excludes or avoids** the use of fertilizers, pesticides, growth regulators, etc. and relies mainly on organic sources to maintain soil health, supply plant nutrients and minimize insects, weeds and other pests.

#### **Present Status of Organic Farming:**

- India produces around **1.35 million MT** (2015-16) of certified organic products. The production is not limited to the edible sector but also **produces organic cotton fibre, functional food products** etc.
- In the year 2015, India **ranked first in terms** of the number of organic producers among over 170 countries and **ninth in terms of the area under organic** agriculture.
- India ranked **11<sup>th</sup> in organic products exports** in 2015.
- India is home to 30 per cent of the total organic producers in the world, but accounts for just 2.59 per cent (1.5 million hectares) of the total organic cultivation area of 57.8 million hectares.

#### **Emerging Challenges in Organic Farming:**

- **Lack of proper knowledge transfer** has been a limiting factor towards large scale organic conversion or reduction in chemical load under conventional farming practice.
- At the same time *farmer's participation in problem identification and solving is inadequate*, consequently the technology and innovation uptake were also compromised.
- Majority of agro-research **does not prioritize/focus on dissemination of research outcome** at farmer's level.
- There are **limitations like availability of practical guidelines**, communication gap with small and marginal farmers and lack of comprehensive approach for integration of technological know-how, better marketing options etc, which led to lesser farmers' participation in large scale demonstration.
- But above all the single most criteria which was responsible for limited progress of sustainable farming practice is **lack of comprehensive and economically viable packages** which can offer easy adoptability for the farming community.

#### **Inhana Organic Farming (IR) Technology – A Complete Organic Package of Practice**

- This farming technology was developed by an **Indian Scientist, Dr. P. Das Biswas**.
- He termed it as Inhana Rational Farming (IRF) Technology which provides a nature receptive pathway for crop production taking into account the interrelated and integrated relationships of all the components of the ecosystem.
- This Farming technology has already been widely adopted in reputed tea estates in India and has shown its effectivity towards the reduction of chemical/pesticide load and management of recurrent disease problems.
- In the Agriculture Sector, the technology has been tried out in different crops like paddy, baby corn, green-gram, cabbage, okra, tomato, brinjal etc. and had turned out to be quite satisfactory.

### **Marketing and Branding of Organic Farming**

- Organic farming offers the promise of a future where food and farm products are produced in an ecological, sustainable and healthy manner.
- **Madhya Pradesh is the largest** producers followed by Maharashtra, Karnataka, Uttar Pradesh, and Rajasthan.
- In terms of commodities, **Oilseeds are the single largest category** followed by sugar crops, cereals and millets, fiber crops, pulses, medicinal, herbal and aromatic plants, and spices and condiments.
- To strengthen organic farming, the **National Programme for Organic Production (NPOP)** was implemented which involves the accreditation programme for Certification Bodies, standards for organic production, promotion of organic farming, etc.

### **Global Organic Food Market**

- The organic farmland increased substantially to 69.8 million hectares till 2017 with the engagement of **181 countries**.
- Australia is the country with the most organic agricultural land with 35.6 million hectares followed by Argentina with 3.4 million hectares and China with 3 million hectares.
- Indian producers are largest in number, followed by Uganda and Mexico.
- The United States is the largest market for organic produce followed by Germany and France, together contributing 67% of the organic market globally.

### **Domestic Organic Food Market**

- In India, the organic market is considered as a niche market segment and is still to sweep across the nation. Increasing per capita income, the growth of e-commerce, rising double income families are the major boost to the growth of the organic market.

### **Key Drivers of Marketing Organic Farming**

- Besides the factors like *health-conscious consumers, rising double income families and urbanization* several schemes are being implemented which support the production and marketing activities of organic produce in the country.
- Use of organic inputs like vermicompost, organic/bio-fertilizers, city compost, waste decomposer, phosphate-rich organic manure (PROM) has been promoted with the aim to reduce the costs of production in organic farming.
- Furthermore, assistance is being provided to Farmer Producer Companies for the development of value chains/marketing of organic produce.
- **Bio-villages (JaivikGaon)** initiatives have been taken by many states like **Bihar and Madhya Pradesh**.

Aquaponics is a method of production that combines raising fish with soil-less plant production by creating a symbiotic ecosystem.

### **Key Challenges while promoting Organic Farming:**

- **Low crop yield during conversion-** The productivity of organic cultivation is lower than conventional practices during conversion period of 3 years and there is no premium price for the produce.



- **Inadequate Quality Standards-** The quality standards for biomass and other inputs need to be standardized as per the market requirements.
- **Policy support-** In India agriculture being a state subject, the respective State Government has to take firm decisions to promote organic farming in their states. The complexity of the organic certification system with a high cost as well as time (3 years in most cases) in one of the major challenges faced by small and marginal farmers.
- **Inadequate Agriculture Marketing Infrastructure**
- **Limited availability of Organic Food Products-** There are very few retail shops in India that store and sell organic food items. Many fake organic products are also available in the markets, which are diminishing the profits of genuine vendors.
- **Direct Marketing-** Where a producer can sell their produce directly to the consumers.
- **Use of Technology-** Cutting edge technologies are not used.
- **Promotion of High-Value Crop-** a high value high price crop such as western vegetables, medicinal and aromatic plants, superfoods like millets, basmati rice, etc. are not promoted.
- **Crop Planning and Diversity-** Proper crop planning is a key factor of production as well as marketing to get profitability in organic farming.
- **Contract Farming-** As organic farming requires stringent quality control and conventional farmers are far behind to maintain benchmarks, therefore, Contract Farming can emerge as an option to de-risk agriculture at various stages in the value chain, provide support of input-output management to producers and create a win-win situation for both the parties.
- **Collectivization of Farmers-** The collectivization of producers, especially small and marginal farmers into producers' organization are emerging as an effective way to address various challenges such as access to credit and investments, technologies, knowledge support, inputs, and market linkages.
- **Promotion of Input Based Enterprises –** It can expedite not only a faster spread of organic farming, but also has the potential to generate an alternate livelihood for the rural populace.
- **Agripreneurs to provide market-** Agripreneurs may be encouraged and incentivized to assist farmers for better quality products and market linkage.
- **Linking farmers to Processors and Exporters-** There is a need to identify the gap between expectations of buyer and farmers capacity and fill the gap through skill training, infrastructure, and technology.
- **Widespread Extension-** State wise intensive campaign on Organic farming like “**Bio-Village**” has to be adopted by all the states.
- In addition, **Agriculture Extension Institutions** of state has to prepare customized training programmes in consultation with **National Institute of Agricultural Marketing (NIAM)** and **National Institute of Agricultural Extension Management (MANAGE)** to cater to the specific needs of organic farming in terms of promotion and sensitization.

#### **Branding Strategies to Promote Organic Farming:**

- **Agro Tourism –** Pluck and pay model of Agri-tourism may be promoted in which urban families or tourist visit the farm, harvest fruits and vegetables of their choice and pay to farmers.
- **Branding through professionals**

- **Organic Certification**
- **Retailing, Packaging, and Labelling**
- **Participation in Fairs and Exhibitions**

**Conclusion:**

- The system requires a paradigm shift in the approach to the marketing of produce by considering as well as consumers in the value of chain.
- Stringent quality control has to follow, promotion of input enterprises and farmer to farmer extension can play a major role in the conservation process.

**Biofertilizers and Green Manuring**

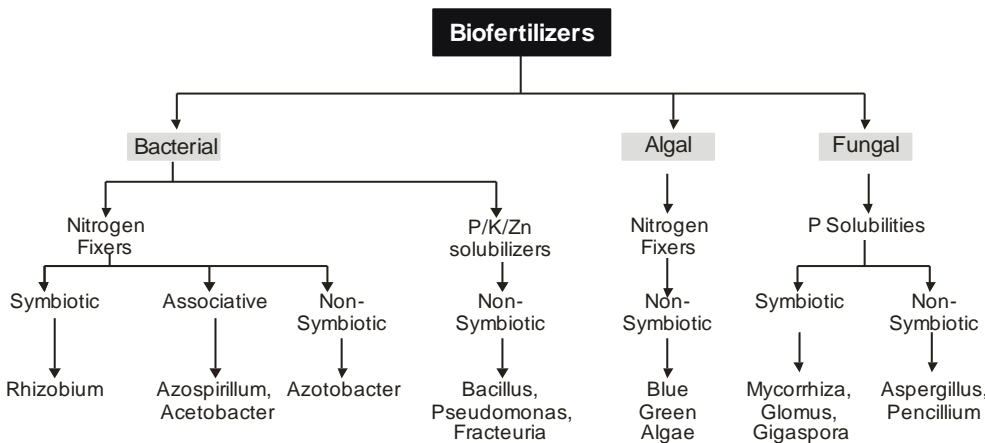
- Biofertilizers and green manures are important pillars of organic farming that support higher yield and maintain soil health.
- **Boifertilizers** is a very cost-effective solution for providing nutrients to crops in a sustainable manner, unlike chemical fertilizers, which are costly and need repeated application.
- Similarly, **green manuring** utilizes lean period between two main crops and improve soil fertility by providing fixed nitrogen and improving organic matter of the soil.

**Biofertilizers**

- Biofertilizers are products of beneficial microorganisms which increase agricultural production by way of nutrient supply especially nitrogen and phosphorus.
- Biofertilizers can **fix atmospheric nitrogen** for plant use and can **mobilize unavailable phosphorous** pool which can be used by plants.
- These biofertilizers are inexpensive, simple to use and have no problem of environmental pollution.

**Types of biofertilizers**

- Biofertilizers have been broadly classified as **nitrogen biofertilizers, phosphate biofertilizers and plant growth promoting biofertilizers** which also includes potassium solubilizing microorganisms.
- Classification along with suitable examples can be seen in following diagram:



The symbiotic nitrogen fixers undertake the fixation in the association of plants whereas non-symbiotic



organisms do not require any association.

**Plant Growth Promoting Rhizobacteria (PGDR)**

- PGPR is a group of beneficial bacteria that improve plant growth by the production of plant hormones, such as auxins, gibberellins and cytokinins, or by providing biologically fixed nitrogen.
- These PGPR also suppress the bacterial, fungal and nematode pathogens by the production of siderophores, HCN, ammonia, antibiotics, volatile metabolites, etc.

**Azolla**

- *Azolla* is a **free-floating water fern** which in symbiotic association with *Anabaena azollae* contributes 40-60 kg N per hectare per crop.
- The important factor in using *Azolla* as a biofertilizer for paddy is its quick decomposition in soil and efficient availability of its nitrogen to the crop.

**Benefits of applications of different biofertilizers:**

1. Provide various nutrients to plants like N, P, K etc.
2. Biofertilizers protect plants from plant diseases as they secrete many antibiotic compounds.
3. Biofertilizers also secrete some plant growth promoting hormones.
4. It helps plants in avoiding water stress by secreting some polysaccharide which helps in soil aggregation and conserving moisture for longer times.

**Major biofertilizers and target crops**

Biofertiliser	Target Crop
<b>Nitrogen Fixing Biofertilizers</b>	
Rbizobium	Pulses
Azotobacter	Wheat, maize, cotton, mustard and vegetables (Potato, Onion, tomato, brinjal and others)
Azospirillum	Cereal crops like wheat, maize, millets, sorghum, barley; and sugarcane
Acetobacter	Sugarcane
Blue green algae (BGA), Azolla	Rice
PGDR and Phosphate/Potassium/Zinc Solubilizing microorganism	All
Arbuscular mycorrhiza	Field crops, nursery-raised crops and orchard trees

**Constraints**

1. Timely supply of cultures in remote corners of the country where organic agriculture is practiced.
2. Lack of knowledge
3. The persons involved in the quality control are not versed with the proper tools and techniques of handling biofertilizers samples.

**Green Manuring**

- Green manuring can be defined as a *practice of ploughing or turning into the soil undecomposed green plant tissues grown in-situ or cut and brought in for incorporation for the purpose of improving physical structures as well as the fertility of the soil.*
- Green manuring is usually done in the lean period available between the two main crops.

#### **Kind of green manuring:**

Green manuring can be broadly divided into two classes based on the basis of the cultivation method.

1. ***In-situ green manuring:*** Green manure crops are grown in the desired field and buried in the same field for green manuring. Nitrogen-fixing legumes which produce heavy tender growth early in its life cycle are most suitable for green manuring.
2. ***Green leaf manuring:*** In green leaf manuring, leaves and tender green twigs are grown in separate fields, bunds or wastelands and incorporated in the soil of some other field.

#### **Advantages of the Green manuring**

1. It adds organic matter to the soil which helps in maintaining the activity of the beneficial soil microorganisms.
2. Improve the physical structure of the soil by increasing humus and organic matter content of the soil.
3. Leguminous green manuring crops like dhaincha, add nitrogen to the soil for the succeeding crop besides increasing the availability of nutrients like phosphorus, potassium, calcium, magnesium and iron.

#### **Disadvantages of the green manuring under organic farming:**

1. If not properly decomposed, the green manure crop may hamper the germination and growth of subsequent crops by immobilization of plant nutrients.
2. An increase of diseases, insects and nematodes is possible if the green manure crop is not properly decomposed before sowing of next crop.

#### **Conclusion:**

- Through both biofertilizers and green manuring are old and established technologies many farmers are not aware of the benefits of these technologies.
- Extension workers should train more farmers about the proper use of biofertilizers for maximum benefits. Timely availability of quality biofertilizers and green manure crop seeds can help in meeting the demands of organic producers especially in distant areas.

#### **Changing Scenario of Organic Farming**

- The **FAO's Codex Alimentarius Commission** (June 1999) states: "Organic Agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity".

#### **Why Organic Farming?**

In India- after Power-Agriculture (19%) is the second highest emitter of greenhouse gases.

##### **A. Environmental friendly**

**B. Reduces the carbon emission by 40 to 60 percent compared to farming with chemical fertilizers and pesticides**

- In order to grow 1 kg of rice, we leaves a carbon footprint of 902 gram (due to the swamp effect of methane emission from standing water). The technology inputs of SRI reduce this substantially if not completely eliminate the requirement of standing water.
- C. Does not pollute the environmental with chemicals hence it preserves the biodiversity of animal, plant, insects and micro-organism species**
- D. Conserves water and enhances moisture retention in fields**
- E. Organic Farming ensures sustainable soil health and reduce soil erosion**
- F. Reduces the use of non-renewable energy**
- G. Organic Farming is a healthier option**
- A review indicated that in 43 cases, organic food was having higher nutrients, in 45% cases equal and 11% cases lower nutrients comparatively higher polyphenol and vitamin C content in the organically grown tea and potato respectively.
  - Farmers who have adopted non-pesticide management agriculture have been totally free of pesticide-related hospitalization”
- H. Organic products taste better:** flavoring ingredients, oils and other taste giving components have been found to be higher in organic products.
- I. Climate Change Risk Management:** Organic Agriculture is better able to withstand drought and flood conditions.
- J. Increased Livelihood**

#### **Changing role of organic agriculture in the rural economy – a Paradigm shift**

- Out of the 145727 crore farmer holding in India, the marginal (less than 1 hectare) holdings are 99885 with average size 0.38 hectares and the small (1.0 to 2.0 hectares) are 25777 crore with average size 1.41 hectares.
- These two comprise a total of 76.21 per cent of the total holding.
- These holdings are primarily in rainfed areas, these farmers are the most distressed section of the farming community yet they together produce over 40% of our agri production. The climatic changes affect them the most and they also cannot afford the costly chemical inputs of hybrid seeds, chemical fertilizers, and pesticides.
- This is where organic farming can come to their rescue.

#### **Case Study:**

- Farmers in **Nalanda district of Bihar** were trained in **System of Rice Intensification (SRI)** and **System of Crop Intensification (SCI)** in 2008.
- After one year the average increase in overall yield was 86%. However, a few educated young farmers started innovating with traditional methods of nitrogen-fixing, green manuring, crop rotation, etc, and broke notional record in rice, wheat, potato, and onion.
- By 2011, they were close to world record and in 2012 they set a new world record in each.

#### **SRI (System of Rice Intensification)**

- Under this system, the requirement of seed is only one-eighth (1/8) and the requirement of water is reduced to twenty percent.

- No standing water is required. This eliminates the swamp effect of rice cultivation and consequent methane gas emissions.

**Conclusion:**

- The future of Organic Farming in India is not only the certified niche market for domestic and export market but mass production of organic agriculture as the norm, with its huge impact on malnutrition, health, production and upsurge in the rural economy.
- The need of the hour is a Mission Mode on Organic to be achieved within a limited time frame.

**Role of NABARD in Organic Farming****Conventional Vs. Organic Farming:**

- There are solid bases of studies that suggest organic is **equal to or more profitable** than conventional farming.
- Part of that competitive edge comes from the premium price – driven by, consumer demand – which organic farmers can get for their products.
- One of the most persistent myths the studies **consistently debunk** is that **organic systems are incapable of reaching the same yields as conventional systems.**
- After a transitional period of 3 to 5 years, organic systems can produce up to 95 percent of conventional yields.
- Organic farming is **less dependent on fossil** fuels, expensive inputs, and annual loans, making it less vulnerable to financial market fluctuations.
- Organic is a low-waste system that emphasizes quality over quantity, meaning it uses land for the same profit.

**Natural Capital- A new concept of Economy**

- The **capital is defined** as money, machinery, tools or other physical assets that help increase an entity's wealth.
- **Natural capital is a new branch** of economics that would like to **recognize the ways we benefit from natural systems as a form of capital.**
- Natural capital includes a mind-boggling array of ecosystem services and resources provided by the natural world, some of which we are yet to discover.
- For example, think of trees making oxygen and capturing pollutants from the air, wetlands filtering water, insects pollinating plants, and the incredible biodiversity of a place like the Amazon rainforest generating new medicines.
- **Natural capital is a relatively new field of study, and economists and scientists are just beginning to unpack the ways we can attribute values to it within agricultural systems.**
- As we learn more about the economics of natural capital and organic agriculture, we will be able to convince more farmers to make the switch increasing the world's profits of biodiversity, nutritious food, and healthy ecosystems, farm by farm.

**NABARD and Organic Farming:****A. NABARD Consultancy services for Organic Farming**

- **Nabcons** has the know-how on cultivation practices under organic farming through alternate Eco-friendly Technologies like Biofertilizers, Bio-pesticides, Neem formulations, Bio-fuels, etc.

**B. Subsidy schemes of NABARD for Organic Farming:**

- The **capital investments subsidy** scheme for commercial production units of organic/biological inputs is being implemented by the **Department of Agriculture & Cooperation** through the **National Centre of Organic Farming (NCOF) in collaboration with NABARD**.
- The main objectives of the scheme are to promote organic farming in the country by making available the organic inputs, to increase agricultural productivity while maintaining the soil health and environmental safety.
- The scheme **provides credit linked and back-ended capital investment subsidy**.
- **Biofertilizer and bio-pesticides** unit are provided with a capital subsidy of 25% of the total project cost subject to a maximum of Rs. 40 lakhs per unit.
- **Fruit & vegetable compost** units are provided with a capital subsidy of 333 per cent of the total project cost subject to a maximum of Rs. 60 lakhs per unit.